IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	AVNI, Dov et al.	Examiner:	BRUTUS, Joel F.
Serial No.:	10/551,053	Group Art Unit:	3777
Filed:	May 16, 2007	Confirmation No.:	4577
Title:	APPARATUS AND METHOD FOR LIGHT CONTROL IN AN IN-VIVO IMAGING DEVICE		

REPLY BRIEF

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This Reply Brief is being filed following the July 18, 2011 Examiner's Answer, the due date for filing a reply being September 18, 2011. Thus this paper is being timely filed.

This paper is being filed in conjunction with a request for oral hearing, with the required fee.

ARGUMENTS

Applicants' independent claim 81 recites, inter alia:

> a controller, wherein the controller is configured to, across a plurality of imaging periods, within each imaging period, operate the light source to emit white light, record, via one or more control pixels, *the control pixels being a subset of the plurality of pixels*, the amount of the white light that is reflected to the imaging device, control the image gain level of the imager based on the amount of the white light that is reflected to the imaging device, and capture and transmit an image frame. (emphasis added)

Applicants assert that none of references used by the Examiner to reject the claims, Tanaka (US Pat. 6,667,765), Yamanaka (US Pat. 6,219,091), Higuchi (US Pat. 6,254,531) or

Fulghum (US Pat. 6,364,829), alone or in combination, teaches or suggests either "control pixels" in general or "control pixels being a *subset* of the plurality of pixels" (emphasis added).

Regarding the limitation of "control pixels," on page 11 of the Examiner's Answer, the Examiner reiterates that the basis of the rejection regarding the limitation of "control pixels" is found in page 28, ll. 12-16 of the Specification (paragraph [0129] of the Application as published as cited by the Examiner), without addressing Applicants' statement on page 7 of the Appeal Brief that "fast readout" is the only teaching that is described as being known in the prior art.

This section of page 28 of the Specification (paragraph [0129] of the publication) states "control pixels may be adapted for fast-read out, which is well known in the art." As stated by Applicants and not discussed by the Examiner, this section clearly states that it is the "fast read-out," not the "control pixels," which is well known in the art. According to English grammatical rules, a relative clause, also known as an adjective clause, ("which is well known in the art") starting with a relative pronoun ("which") modifies the noun or pronoun preceding it ("fast read-out") (e.g., see page 2 of the Appendix, lines 9-10, source: http://www.whitesmoke.com/clauses-in-english (printed 5-AUG-11)).

The Examiner further cites to page 33, ll. 19-30 of the Specification (paragraph [0152] of the Application as published). The Examiner, referring to this section of the Specification, again incorrectly links "as is known in the art" with a clause that is not modified thereby, and furthermore, is not even in the same sentence. The Examiner takes the phrase "as is known in the art," which actually modifies "to randomly scan any desired pixel in a CMOS pixel array, by suitably addressing the pixel readout lines" and connects it to a sentence fragment from an entirely different sentence: "scanning of the control pixels 160C may be performed similar to the scanning of the regular pixels 160P." This rearrangement of the language of the application is not within the description of the Application as filed. If the Examiner were allowed to link the phrase "as is known in the art" with elements that the phrase is not meant to modify, then the Examiner would be able to incorrectly apply this phrase to any teaching in the Application, thereby incorrectly rendering any teaching as prior art. This is a clear misinterpretation of the Application as filed.

Applicants note regarding page 33, ll. 19-30 of the Specification (paragraph [0152] of the Application as published) that scanning control pixels 160C similarly to regular pixels 160P does not render control pixels 160C equivalent to regular pixels 160P.

The Examiner also cites to page 35, ll. 14-24 of the Specification (cited to by the Examiner as paragraph [0159] of the Application as published). In this paragraph the phrase "known in the art" modifies "center biased intensity weighting," "biased measurement," and "weighting," but not "control pixels." On page 12 of the Examiner's Answer, the Examiner cites to page 39, ll. 5-15 of the Specification (cited to by the Examiner as paragraph [0175] of the Application as published), which teaches, "the control pixels 160C may be fabricated as analog photodiodes with appropriate readout or sampling circuitry (not shown) as is known in the art." Once again, it is clear that it is the "readout or sampling circuitry" and not the "control pixels 160C" that is known in the art.

Regarding the limitation of "control pixels being a *subset* of the plurality of pixels" (emphasis added), in the Response to Arguments section on page 7 of the Examiner's Answer, the Examiner reiterates that the basis of the rejection regarding the limitation of "control pixels being a subset of the plurality of pixels" is that "Fulghum discloses using 1/2 to 1/3 of pixels [see column 10 lines 1-15] which constitutes subset of all the pixels." This is a misinterpretation of Fulghum. In lines 1-15 of column 10 of Fulghum, 1/2 and 1/3 are used only when describing a ratio image pixel value. A ratio image pixel value does not describe a number of pixels, or a subset of pixels, but rather a value ascribed to one pixel. Column 10 lines 1-15 of Fulghum defines "1/2 to 1/3" to be a "ratio image pixel *value*" (see column 10, lines 4-5, emphasis added). The ratio image pixel value is the *value* of a pixel in an autofluorescence image divided by the *value* of a pixel in a reference image (see column 9 lines 53-56). Furthermore, these fractions "1/2 to 1/3" are ratios of pixel values for *individual* autofluorescence image pixels ("on a pixel-by-pixel basis [in] the autofluorescence image") compared to a pixel of a reference image, not a ratio of *a subset of* pixels within the image, as required in claim 81.

In the first paragraph on page 8 of the Examiner's answer, the Examiner reiterates Applicants' argument from page 5 of the Appeal Brief that none of the Examiner's definitions of pixel values are relevant to or can be used with the claim language regarding a

subset of pixels. In an attempt to refute Applicants' argument, in the second and third paragraphs of page 8 of the Examiner's answer, the Examiner describes embodiments from Applicants' own Specification (e.g., selecting saturated pixels in the second paragraph and a mosaic structure of pixel data in the third paragraph) and in the following paragraph bridging pages 8 and 9 of the Examiner's Answer, the Examiner uses this teaching to tie elements of Fulghum to elements of Applicants' claims. This is an improper use of hindsight as discussed in further detail below.

In the paragraph bridging pages 8 and 9 of the Examiner's Answer, the Examiner describes in Fulghum "selecting pixels that are reset and applied a threshold value [see column 10 lines 21-23]" and a "few pixels are saturated [see column 9 lines 44-45]." The Examiner proceeds to state that "One skilled in the art provided with Fulghum's teaching which has a capability of selecting pixels (which is a subset) that are saturated and apply a threshold, would have been motivated to control exposure time based on the subset of pixels that are saturated." Applicants respectfully disagree.

It is clear that the sections of Fulghum referenced by the Examiner describe only a subset of saturated pixels, but these pixels are not described as *control* pixels, as required in Applicants' claim 81. Simply measuring the saturation of thresholds has no connection with controlling the gain level, and simply defining a subset of pixels does not suggest or make obvious Applicants' claimed "control pixels being a subset of the plurality of pixels". To cure this deficiency in Fulghum and make a connection between selecting saturated pixels (in Fulghum) and controlling the gain level (in Applicants' claim 81), the Examiner points to Applicants' own Specification to show how measuring saturation may be used to make gain decisions: "a reliable exposure measurement may require approximately 1.5% (for example, 11 pixels out of 640) of the selected pixels to be saturated in order to pass a saturation threshold, according to which gain decisions may be taken" (see page 44, ll. 27-30 of the Specification, cited by the Examiner as paragraph [0195] of the Application as published). However, the use of Applicants' own specification in support of this interpretation of obviousness is improper: Applicants' specification describes the invention not in the prior art. The Examiner must "provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." (MPEP 2144.04, citing *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353

(Bd. Pat. App. & Inter. 1984)). Furthermore, the Court of Appeals for the Federal Circuit has stated that, "To draw on hindsight knowledge of the patented invention, when the prior art does not contain or suggest that knowledge, is to use the invention as a template for its own reconstruction — an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996) (citing *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983))." (*Ex Parte Schoemann et al.*, Appeal No. 2009-4371 (BPAI)). Since the Examiner has found no citation or motivation *in the references of record themselves* to use saturated pixels to control a gain level, Fulghum does not make obvious Applicants' claim 81.

On page 9 of the Examiner's Answer, the Examiner asserts that Fulghum teaches "control pixels" by "selected pixels that are reset and applied a threshold [see column 10 lines 21-23]" and "pixel of colors red, green, and blue [see column 10 lines 1-14]." Applicants respectively disagree. Again, the Examiner relies on a teaching in Applicants' own Specification (page 44, ll. 27-30) to explain that selecting saturated pixels may be used to make gain decisions, which as described above is improper. There is no motivation stated in Fulghum or any other reference of record, without the benefit of Applicants' specification, to use pixels for device control, e.g., "control pixels." In fact, Fulghum describes using pixels for detecting dysplasia in the images (e.g., see Abstract, column 9 lines 33-35 and column 10 lines 25-27). Detecting an image feature such as dysplasia is an act of image analysis, which does not actively control the operation of the device in any way. Therefore, Fulghum does not teach or make obvious using "control pixels."

The first paragraph on page 10 of the Examiner's Answer states, "Applicant argues that Fulghum doesn't teach using the pixels of an imager (a physical device) as input for any reason (including illumination level control)." This is not the case. To clarify Applicants' argument, Applicants assert that Fulghum doesn't teach using the pixels of an imager (a physical device) as input *to control the imager (or any other physical device)* for any reason (including illumination level control). In the following paragraph, the Examiner states that "Fulghum determines saturation of selected pixels by comparing to a threshold just as Applicant." Applicants note that determining saturation and comparing to a threshold (a passive step of analyzing the *output* of an image) is not equivalent to controlling the imager

or any other physical device (an active step of controlling the *input* to the imager). Again, the Examiner uses the benefit of Applicants' own specification ("just as Applicant") to cure the deficiencies of Fulghum, i.e., to explain how determining saturation is related to controlling the imager (which the Fulghum reference itself does not teach). The Examiner further refers to Tanaka, which by the Examiner's own admission (in the third full paragraph on page 5 of the Examiner's Answer) does not disclose "operating the light source via one or more control pixels."

In the section from the third paragraph on page 10 to the first paragraph on page 11 of the Examiner's Answer, the Examiner uses page 44, ll. 27-30 of Applicants' own Specification (cited by the Examiner as paragraph [0195] of the Application as published) to provide teaching required for the obviousness rejection that is otherwise absent from the references of record. As explained above, such a rejection is improper and therefore claim 81 is allowable.

Claims 90, 97 and 100 each include different limitations from claim 81, but the arguments above apply to those claims as well.

Conclusion

Therefore, independent claims 81, 90, 97 and 100 are allowable over Tanaka, Yamanaka, Higuchi, Fulghum, and the information provided in Applicants' Specification, alone or in combination.
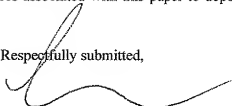
Each of claims 85, 91, 98-99, and 101-102 depends from one of claims 81, 90, 97, or 100 and includes all the limitations thereof. Therefore, each of claims 85, 91, 98-99, and 101-102 are likewise allowable.

Accordingly, Applicants respectfully request that the rejection of claims 81, 85, 90-91, and 97-102 under 35 U.S.C. § 103 be withdrawn.

No additional fees are believed to be due in connection with this paper. However, if any such fees are due, please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,

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